LETTERS TO THE EDITOR

Prompt publication of brief reports of important discoveries in physics may be secured by addressing them to this department. Closing dates for this department are, for the first issue of the month, the twenty-eighth of the preceding month; for the second issue, the thirteenth of the month. The Board of Editors does not hold itself responsible for the opinions expressed by the correspondents.

Accurate Determination of Excitation Energy by Electron Impact

Science Abstracts 4193, 1931, calls attention to a somewhat inaccessible paper by Whiddington and Roberts[1] on the accurate determination of excitation energy by electron impacts in helium "with a degree of precision not hitherto obtained". In the table given in the abstract the observed values differ from those calculated from spectroscopic data by from two to five times the stated probable error, being always higher. This might well be interpreted as significant.

In view of this fact it is unfortunate that the agreement between observed and calculated values did not receive greater stress in a recent paper by the writer.[2] The excitation losses suffered by electrons scattered inelastically in the forward direction were measured by means of an electrostatic analyzer. Although the experiment yielded values for the energies corresponding to the first two excitation losses in helium, neon, and argon as shown in the published curves, only the values for the principal losses were discussed in the text. The second losses can be determined with almost the accuracy of the first by measuring the voltage difference between the corresponding peaks in the energy distribution curves. The results are summarized in the table.

TABLE I. *A comparison between observed and calculated values for excitation energy losses (in volts).*

Gas	Transition	Observed value	Calc. value	Difference
He	1^1S-2^1P	21.13	21.11	+0.02
He	1^1S-3^1P	23.02	22.97	+0.05
Ne	$1^1S_0-1s_4$	16.64	16.59	+0.05
			(16.6)*	+0.04
Ne	$1^1S_0-2p_8$	18.53	18.48	+0.05
			(18.5)*	+0.03
A	$1^1S_0-1s_4$	11.53	11.56	−0.03
			(11.5)*	+0.03
A		13.88	(13.9)*	−0.02

* Hertz's excitation potential values (see Franck and Jordan, "Anregung von Quantensprüngen durch Stosse", p. 162).

In the designation of the losses in neon and argon, Paschen's notation has been used for the upper terms to avoid unwarranted theoretical implications. The argon $1^1S_0-2p_8$ loss corresponding to Hertz's 13.0 volt excitation potential was not sufficiently probable to be definitely located, and the correct designation for the 13.9 volt loss is not obvious.

The agreement throughout is as good as could be expected with this type of measurement, and the conclusion is that no significant deviation from the spectroscopic values for excitation losses has been detected.

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February 15, 1932.

[1] Whiddington and Roberts, Leeds Philosoph. and Lit. Soc. Proc. **2**, 201 (1931).
[2] Van Atta, Phys. Rev. **38**, 876 (1931).

Evaporation of Platinum in Vacuum from a Tungsten Filament

Platinum may be evaporated in vacuum at temperatures below the fusion or evaporation temperatures of tungsten. This makes possible the substitution of the evaporation technique[1] for sputtering. Previous attempts to evaporate platinum were unsuccessful be-

[1] R. S. I. **2**, 189 (1931).

cause it was not possible to heat it efficiently when a small piece was simply laid in a tungsten coiled filament. The evaporation is, however, easily effected when platinum is electro-deposited onto the tungsten filament. The citric acid platinum plating solution used near 100°C is satisfactory for this electro-deposition. Best evaporated deposits are obtained when the work is shielded from the hot tungsten filament until after the fusion temperature of platinum has been attained. For the conservation of platinum the filament may be inclosed in a box made from tungsten foil. A window in this box allows the evaporation to be restricted as desired. The platinum deposit on the walls of the box may be dissolved in hot aqua regia or if a copper box is used the platinum may be peeled off in the form of a thin foil.

Mirrors, interferometer plates, fibers, etc., may be coated with platinum by this technique with less trouble and better results than by sputtering.

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Far Ultraviolet Eigenfrequencies of the Alkali Halides

The following preliminary experiments on the proper frequencies of absorption by the lattices of the alkali halides in the far ultraviolet have recently been carried out by the author.

A normal incidence vacuum spectrograph, having a concave speculum grating of one meter radius with a dispersion of 17 A.U. per millimeter, and a "hot spark" for a light source, was used. This apparatus, when using tungsten electrodes and oiled films, gave spectra to about 375A.U.

A. H. Phund (Phys. Rev. **32,** 39 (1928)), by a reflection method was the first to find an eigenfrequeny in the ultraviolet for NaCl and KCl. These frequencies were found to be in the 1600A.U. region, as had been predicted by Herzfeld and Wolf (Handbuch der Physik. Vol. XX).

In an extention of this work, it has been found troublesome to prepare very thin films, which besides being transparent to the region in question are at the same time mechanically strong enough to form a backing for the salt under investigation. The necessity of a thin transparent support for the distilled halide is obviated by vaporizing the salt onto the ruled surface of the grating. This is accomplished by distilling the salt from a conical platinum spiral supported in the vacuum spectrograph about ten centimeters from the grating and just far enough to one side to be out of the light path. Successive thin layers of the salt are vaporized, in this way, onto the grating, while an exposure is made for each thickness. Justification for distilling the salt on the grating is found in the observation that a very thin layer of methyl analine violet on polished speculum shows the characteristic purple transmission of the dye, while a very thick film shows the characteristic green metalic reflection.

The results show:

1. That for the very thinest salt film on the grating there is a slight general enhancement of the entire spectrum from about 1000A.U. to 2000 A.U. while the continuous absorption becomes apparent at about 400A.U.

2. That for the next thickness of salt, the sharp absorption minimum clearly reveals itself in the 1600A.U. region, while the absorption near 400A.U. broadens, extending to longer wave-lengths.

3. That with still increasing salt thickness the minimum around 1600A.U. which is due to absorption disappears, while the reflection maximum comes out rather intensely with a noticeable shift to longer wave-lengths.

4. That there is no separate absorption band at 900A.U. This band was thought to exist as a characteristic of the complete liberation of the extra electron of the negative ion from the crystal lattice.

The present work has been concerned chiefly with sodium chloride. Experiments are now in progress on the remaining alkali halides. These measurements will be checked by studying the absorption of the same salts when they are distilled onto very thin transparent supporting films, so that the true eigenfrequencies for all these substances may be determined.

At the present, the author wishes to stress the value of using this method, i.e., the distillation of the salt onto the grating, as a helpful exploratory means of investigation for similar work in the far ultraviolet. At the present early stage of the experiments, it is